

LETTER TO THE EDITOR

Effect of orthodontic brackets and different wires on radiofrequency heating and magnetic field interactions during 3.0-T MRI: Author response

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To the Editor,

We have read the comments of Mortazavi et al¹ about our article² entitled “Effect of orthodontic brackets and different wires on radiofrequency heating and magnetic field interactions during 3.0-T MRI” that is published in *Dentomaxillofac Radiol* 2014; 43: 20130356. We are grateful to the authors for their interest and constructive comments. In our study, we used saline solution in order to mimic oral environment and placed the specimens in this solution. We calculated the temperature changes of both the solution and the specimens before testing, after T_1 weighted axial imaging sequence and at the end of total imaging. We did not use the formula that Mortazavi et al¹ mentioned in their letter. We just calculated the heat difference between the sequences with an infrared thermometer. Several previous studies^{3–5} used fluoroptic or fibre optic probes for the determination of radiofrequency heating. In these studies, there was no explanation regarding the use of the formula that Mortazavi et al¹ has mentioned in their letter. The main idea of our study was to find out whether the heating of the orthodontic brackets

and wires affected the vitality of the teeth. Therefore, maximum heat change that we found as 3.20 °C did not exceed the vitality boundary of the pulpa. It is well known that, even for dental implants, heating >47 °C can cause injuries to adjacent bone tissues and vessels.⁴ The temperature changes in the oral environment and dental tissues cannot be directly transmitted to the pulpa, as enamel and dentin structures are present over it. Therefore, it is unlikely that the maximum heat change that we found in our study with a basic mathematical calculation could not start the protein denaturation. Also, when we inspected the scientific formula that Mortazavi et al¹ mentioned, the maximum temperature change was found as 0.025 °C. In that case, this result also presents that the heating of orthodontic brackets and wires during 3.0T MRI is not hazardous for patients.

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